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NEW HAMPSHIRE COLLEGE

AGRICULTURAL EXPERIMENT STATION

INSPECTION OF FERTILIZERS

IN 1902

In Coöperation with the State Board of Agriculture

Analyses of Wood Ashes and Miscellaneous Fertilizing Materials

NEW HAMPSHIRE COLLEGE
OF
AGRICULTURE AND THE MECHANIC ARTS
DURHAM

TRADE VALUES OF FERTILIZING INGREDIENTS IN RAW MATERIALS AND CHEMICALS, 1902.

	Cents per pound.
Nitrogen in ammonia salts	16.5
" nitrates	15.
" dry and fine ground fish, meat, and blood, and in high grade mixed fertilizers	16.5
" fine ground bone and tankage	16.0
" medium ground bone and tankage	12.0
Phosphoric acid soluble in water	5.0
" " " ammonium citrate (reverted)	4.5
" " in fine ground bone, fish, and tankage	4.
" " in coarse bone and tankage	3.
" " in cotton-seed meal, castor-pomace, and wood ashes	4.
" " insoluble in mixed fertilizers	2.
Potash as sulphate free from chlorides and in wood ashes	5.
Potash as muriate	4.25

The above values are based on the wholesale market price for the materials, when sold in large lots at the principal trade centers in New England. The valuation of a ton of any mixed fertilizer based on the above figures will usually fall ten dollars below the retail price at the local agency. This variation includes such fixed charges as cost of mixing, bags, cartage, and freight, salaries and commissions of agents, and interest.

Nitrogen in the best animal fertilizers and in nitrates cost more in 1902 than in the previous year. Other prices were unchanged.

THE FERTILIZER INSPECTION IN 1902.

In accordance with the Public Statutes, samples of the different brands of fertilizers licensed to be sold in this state were collected under the supervision of the secretary of the state board of agriculture, Hon. N. J. Bachelder. The analyses of the samples were made at the New Hampshire College Agricultural Experiment Station, under the direction of its chemist, Mr. F. W. Morse. Mr. H. M. Lee, of the New Hampshire College, assisted in collecting the samples, and Messrs. L. A. Hill, W. W. Braman, and A. L. Sullivan performed the analytical work.

In the course of the inspection forty-eight different agencies were visited by Mr. Lee, located in the following towns: Dover, Portsmouth, Milford, Keene, Nashua, Lancaster, Twin Mountain, Whitefield, Littleton, Colebrook, Plymouth, Meredith, Rochester, Milton, Manchester, and Stratham.

The collection of samples was unusually difficult this year, because many of the merchants had abandoned the trade in fertilizers and consequently a large majority of the agencies were held by farmers, which necessitated much more travel and time than in previous years. This condition of the trade was unlooked for, and prevented the gathering of samples of a few brands because the goods were used before the agencies were reached by the inspector.

The fertilizers are in many cases not shipped into New Hampshire until April, which necessitates the collection of samples between then and planting time. The employment of more field agents during the coming season will, however, meet these conditions without materially increasing the expense of the work.

Eighty-one brands of licensed fertilizers were sampled and analyzed. Seven of the fertilizers were deficient in potash, two were deficient in available phosphoric acid, one in total phosphoric acid, and one in nitrogen. This is an excellent showing, since in no case did this deficiency in one constitu-

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ent lower the guaranteed value of the goods, because an excess of some other substance made it up.

In 1901 a new fertilizer law went into effect, and this was the first inspection under the act. A number of unlicensed brands were found, which were not analyzed. Some of these brands were undoubtedly old goods carried over from the previous year, since agents, for obvious reasons, are loth to acknowledge the possession of fertilizers that are a year old. It is highly important that all agents for fertilizers inform themselves definitely that all the brands which they handle are licensed by the manufacturer. The text of the new law follows.

STATE OF NEW HAMPSHIRE.

CHAPTER 43, SESSION LAWS OF 1901.

AN ACT TO REGULATE THE SALE OF FERTILIZERS.

SECTION 1. Every lot or parcel of commercial fertilizer or fertilizer material sold or offered or exposed for sale within this state shall be accompanied by a plainly printed statement, clearly and truly certifying the number of net pounds of fertilizer in the package, the name, brand, or trade-mark under which the fertilizer is sold, the name and address of the manufacturer or importer, the location of the factory, and a chemical analysis stating the percentage of nitrogen, of potash soluble in distilled water, of phosphoric acid in available form soluble in distilled water, and reverted, and of total phosphoric acid.

SECT. 2. Before any commercial fertilizer is sold or offered or exposed for sale, the manufacturer, importer, or party who causes it to be sold or offered for sale, within this state, shall file with the secretary of the board of agriculture a certified copy of the statement named in section 1 of this act, and shall also deposit with said secretary, at his request, a sealed glass jar or bottle containing not less than one pound of the fertilizer, accompanied by an affidavit that it is a fair average sample thereof.

SECT. 3. The manufacturer, importer, agent, or seller of any brand of commercial fertilizer or fertilizer material shall pay for each brand on or before the first day of March, annually, to the secretary of the board of agriculture, an analysis fee, as follows, namely: ten dollars for the phosphoric acid, five dollars for the nitrogen, and five dollars for the potash, contained or claimed to be in the said brand of fertilizer, but the fee for any brand shall not exceed fifteen dollars; *provided*, that whenever the manufacturer or importer shall have paid the fee herein required, any person acting as agent or seller for such manufacturer or importer shall not be required to pay the fee named in this section.

SECT. 4. No person shall sell or offer or expose for sale in this state any pulverized leather, hair, or wool waste, raw, steamed, roasted, or in any

form as a fertilizer, without an explicit printed certificate of the fact conspicuously affixed to every package of such fertilizer.

SECT. 5. Any person selling or offering or exposing for sale any commercial fertilizer without the statement required by the first section of this act, or with a label stating that said fertilizer contains a larger percentage of any one or more of the constituents mentioned in said section than is contained therein or respecting the sale of which all the provisions of the foregoing sections have not been fully complied with, shall forfeit fifty dollars for the first offense and one hundred dollars for each subsequent offense.

SECT. 6. This act shall not affect parties manufacturing or importing fertilizer for their own use and not to sell in this state.

SECT. 7. The secretary of the board of agriculture shall annually cause to be analyzed at the New Hampshire College Agricultural Experiment Station one or more samples of every commercial fertilizer or fertilizer material sold or offered for sale under the provisions of this act. Said secretary shall cause a sample to be taken, not exceeding two pounds in weight, for said analysis, from any lot or package of such fertilizer or fertilizer material, which may be in the possession of any manufacturer, importer, agent, or dealer in this state; but said sample shall be drawn in the presence of the parties in interest or their representatives and taken from a parcel or a number of packages, which shall not be less than ten per cent. of the whole lot sampled, and shall be thoroughly mixed and then divided into equal samples and placed in glass vessels and carefully sealed and a label placed on each, stating the name or brand of the fertilizer or material sampled, the name of the party from whose stock the sample was drawn, and the time and place of drawing, and said label shall also be signed by the person taking the sample and by the party or parties in interest, or their representative present at the drawing and sealing of said samples; one of said duplicate samples shall be retained by the secretary and the other by the party whose stock was sampled; and the sample retained by the secretary shall be for comparison with the certified statement named in section 1. The result of the analysis of the samples shall be published from time to time, together with such additional information as circumstances may advise, in reports or bulletins by the New Hampshire College Agricultural Experiment Station and in the biennial report of the state board of agriculture. All parties violating this act shall be prosecuted by the secretary of the board of agriculture.

SECT. 8. The amount of license fees received by said secretary by virtue of this act shall be paid by him to the treasurer of the state of New Hampshire. The treasurer of the state of New Hampshire shall pay from such amount, when duly approved, the moneys required for the expense incurred in making the inspection required by this act and enforcing the provisions thereof. Said expense shall include those incurred for laboratory expenses, chemical supplies, traveling expenses, printing, and other necessary matters.

SECT. 9. This act shall take effect July first, nineteen hundred and one, and all acts and parts of acts inconsistent with this act are hereby repealed.

COMPOSITION OF COMMERCIAL FERTILIZERS SAMPLED AND ANALYZED IN 1902.

MANUFACTURER AND BRAND.	Nitrogen.		Phosphoric Acid.							Potash.	
					Available.			Total.			
	Found.	Guaranteed.	Soluble.	Reverted.	Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.	Found.	Guaranteed.
AMERICAN AGRICULTURAL CHEMICAL CO.											
Bradley's Corn Phosphate	2.11	2.06	4.92	3.66	8.58	8.00	4.07	12.65	10.00	1.78	1.50
Bradley's Complete Manure for Potatoes and Vegetables	3.51	3.30	6.12	2.90	9.02	8.00	2.65	11.67	9.00	7.54	7.00
Bradley's Complete Manure for Top-dressing Grass, etc	4.97	4.95	1.55	3.92	5.47	5.00	1.55	7.02	6.00	3.20	2.50
Bradley's Eclipse Phosphate for all Crops	1.10	1.03	5.32	3.21	8.53	8.00	2.98	11.51	10.00	2.13	2.00
Bradley's Niagara Phosphate	1.30	.82	3.15	6.32	9.47	8.00	1.75	11.22	9.00	1.52	1.00
Bradley's Potato Fertillzer	2.23	2.06	6.47	3.09	9.56	8.00	2.56	12.12	10.00	3.29	3.00
Bradley's Potato Manure	2.45	2.50	5.22	3.52	8.74	6.00	2.41	11.15	8.00	4.17	5.00
Bradley's X. L. Superphosphate	2.27	2.50	7.47	2.86	10.33	9.00	2.27	12.60	11.00	2.26	2.00
Clark's Cove Bay State Fertilizer	2.15	2.06	6.00	2.87	8.87	8.00	3.23	12.10	10.00	1.63	1.50
Clark's Cove Potato Fertilizer	2.13	2.06	6.05	3.82	9.87	8.00	3.33	13.20	10.00	2.99	3.00
Clevelan l Potato Phosphate	2.12	2.06	6.47	2.99	9.46	8.00	3.04	12.50	10.00	3.74	3.00
Cleveland Superphosphate	2.24	2.06	6.19	2.59	8.78	8.00	2.46	11.24	10.00	1.83	1.50
Crocker's Ammoniated Corn Phosphate	2.10	2.06	5.05	3.88	8.93	8.00	2.29	11.22	10.00	1.89	1.50
Crocker's New Rival Ammoniated Superphosphate	1.21	1.03	5.50	2.98	8.48	8.00	3.07	11.55	10.00	2.42	2.00
Crocker's Potato Phosphate	2.26	2.06	6.84	1.89	8.73	8.00	2.67	11.40	10.00	3.07	3.00
Crocker's Superior Phosphate	1.36	.80	5.52	3.04	8.56	8.00	3.06	11.62	10.00	2.17	2.00
Cumberland Guano	1.25	1.03	5.60	2.71	8.31	8.00	3.19	11.50	10.00	2.50	2.00
Cumberland Potato Fertilizer	1.94	2.06	6.77	3.10	9.87	8.00	2.05	11.92	10.00	3.01	3.00
Cumberland Superphosphate	2.54	2.06	6.87	3.01	9.88	8.00	2.57	12.45	10.00	1.73	1.50
Darling's Farm Favorite	2.68	2.06	5.91	3.70	9.61	8.00	.81	10.42	9.00	4.42	3.00
Darling's General Fertilizer	1.47	1.25	5.79	1.98	7.97	6.00	.33	8.30	7.00	3.48	3.00
Great Eastern General Fertilizer	1.17	.82	6.21	2.54	8.75	8.00	2.55	11.30	10.00	4.01	4.00
Great Eastern Northern Corn Special	2.07	2.06	4.07	4.46	8.53	8.00	3.47	12.00	10.00	1.88	1.50

Great Eastern Potato Manure	2.15	2.06	6.47	2.58	9.05	8.00	2.50	11.55	10.00	2.99	3.00
Packer's Union Gardeners' Complete Manure	2.47	2.40	3.90	3.52	7.42	6.00	2.18	9.60	7.00	11.22	10.00
Packer's Union Potato Manure	2.21	2.06	6.85	3.13	9.98	8.00	2.37	12.35	10.00	5.77	6.00
Packer's Union Universal Fertilizer	1.14	.82	6.36	4.12	10.48	8.00	1.33	11.81	10.00	4.62	4.00
Packer's Union Wheat, Oats, and Clover Fertilizer	.....	.....	7.50	3.65	11.15	11.00	2.15	13 30	12.00	2.40	2.00
Pacific Potato Special	2.07	2.06	6.25	2.59	8 84	8.00	2.55	11.39	10.00	3.20	3.00
Quinnipiac Corn Manure	2.29	2.06	4.35	4.48	8.83	9.00	4.57	13.40	10.00	1.97	1.50
Quinnipiac Potato Phosphate	2.11	2.06	6.97	2.73	9.70	8.00	2.35	12.05	10.00	3.23	3.00
Read's Farmers' Friend Superphosphate	2.12	2 06	6 33	2.30	8.63	8.00	2.87	11.50	10.00	3.08	3.00
Read's Potato Manure	2.57	2.40	4.32	2.33	6.65	6.00	2.25	8.90	7.00	10.59	10.00
Read's Practical Potato Special Fertilizer	.90	.82	3.71	2.59	6.30	4.00	3.35	9.65	5.00	8.09	8.00
Soluble Pacific Guano	2.22	2.06	5.82	2.94	8.76	8.00	2.21	10.97	10.00	1.66	1.30
Williams and Clark American Potato Manure	2.03	2.06	6.37	2.94	9.31	8.00	3.41	12.72	10.00	3.52	3.00
BOWKER FERTILIZER CO.											
Bowker's Corn Phosphate	1.66	1.00	6.29	2.53	8.82	8.00	1.53	10.35	10.00	2.25	2.00
Bowker's Dollar Brand Phosphate	1.07	.80	1.52	5.44	6.96	8.00	3.66	10.62	.....	1.40	1.00
Bowker's Farm and Garden Phosphate	1.77	1.50	6.22	2.60	8.82	8.00	1.81	10.63	10.00	2.38	2.00
Bowker's Hill and Drill Phosphate	2.54	2.25	7.67	2.63	10.30	9.00	1.40	11.70	11.00	2.09	2.00
Bowker's Potato and Vegetable Fertilizer	2.28	2 25	7.41	2.57	9.98	9.00	1.37	11.35	11.00	4.53	4.00
Bowker's Potato and Vegetable Phosphate	1.73	1.50	5.22	3.87	9.09	9.00	2.53	11.62	11.00	2.01	2.00
Bowker's Star Special for Potatoes	1.84	1.50	1.80	4.83	6.63	7.00	2.80	9.43	.....	2.97	3.00
Bowker's Sure Crop Bone Phosphate	.77	.75	5.20	3.62	8.82	9.00	1.55	10.37	11.00	2.37	2.00
Bowker's Twenty-five Dollar Phosphate	2.14	1.50	1.80	5.66	7.46	7.50	2.80	10.26	.....	1.28	1 00
Stockbridge's Potato and Vegetable Manure	3.05	3.00	4.35	2.76	7.11	6.00	1.36	8.47	7.00	10.13	10.00
Stockbridge's Manure for Corn, Grain, etc	3.26	3.00	6.35	1.93	8.28	7.00	1.35	9.63	8.00	7.44	7.00
E. FRANK COE CO.											
E. Frank Coe's Celebrated Special Potato Fertilizer	1.58	1.65	7.65	1.97	9.62	8.00	2.57	12.19	9.50	3.98	4.00
E. F. Coe's Columbian Corn Fertilizer	1.38	1.20	6.85	3.13	9.98	8.50	2.87	12.85	10.00	2.77	2.50
E. F. Coe's Columbian Potato Fertilizer	1.33	1.20	5.65	3.52	9.17	8.50	3.75	12.92	9.50	2.59	2.50
E. F. Coe's High Grade Ammoniated Superphosphate	1.86	1.85	7.46	2.14	9.60	9.00	2.60	12.20	10.00	2.28	2.25
E. F. Coe's New England Potato Fertilizer	1.06	.80	8.00	1.75	9.75	7.50	3.25	13.00	9.00	3.10	3.00
E. F. Coe's XXV Ammoniated Bone Superphosphate	.86	.80	6.52	2.82	9.34	8.50	3.11	12.45	10.00	1.48	1.50
LISTER'S AGRICULTURAL CHEMICAL WORKS.											
Lister's Animal Bone and Potash	.....	.....	7.07	3.53	10.60	10.00	1.80	12.40	11.00	2.37	2.00
Lister's High Grade Special	1.83	1.65	7.58	.39	7.97	8.00	2.18	10.15	10.00	9.60	10.00
Lister's Special Corn and Potato Fertilizer	2.22	1.65	5.97	3.25	9.22	8.00	1.83	11.05	9.00	3.15	3.00
Lister's Success Fertilizer	1.47	1.24	6.76	2.73	9.49	9.00	2.91	12.40	11.00	2.40	2.00

COMPOSITION OF COMMERCIAL FERTILIZERS SAMPLED AND ANALYZED IN 1902.—*Continued.*

MANUFACTURER AND BRAND.	Nitrogen.		Phosphoric Acid.							Potash.	
					Available.			Total.			
	Found.	Guaranteed.	Soluble.	Reverted.	Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.	Found.	Guaranteed.
LOWELL FERTILIZER CO.											
Swift's Animal Brand	2.80	2.47	3.20	6 29	9.49	9.00	2.48	11.97	10 00	4.12	4.00
Swift's Bone Fertilizer	1.88	1.64	6.02	2.43	8.45	8.00	1.40	9.85	9.00	3.48	3.00
Swift's Bone and Potash	2.06	1.65	6.62	2.85	9.47	9.00	1.55	11.02	10.00	2.92	2.00
Swift's Lawn Dressing	4.45	4.11	3.22	4.05	7.27	7.00	1.13	8.40	8.00	6.93	5.00
Swift's Potato Manure	2.00	1.64	5.21	2.40	7.61	7.00	1.91	9.52	8.00	4.67	4.00
Swift's Potato Phosphate	2.71	2.47	6.26	3.08	9.34	8.00	2.05	11.39	9.00	5.64	6.00
Bone and Meat Meal	8.50	.....	.....	.....	5.75	.....	4.15	9.90	.....	.....	.....
NEW ENGLAND FERTILIZER CO.											
Corn Phosphate	1.77	1.64	7.61	1.04	8.65	8.00	1.35	10.00	9.00	3.21	3.00
High Grade Truck	3.94	3.30	6.35	1.25	7.60	6.00	1.12	8.72	7.00	9.75	10.00
Seeding Down Fertilizer	1.70	1.20	7.37	.93	8.30	7.00	.80	9.10	8.00	2.31	2.00
Potato Fertilizer	2.28	1.64	6.65	1.00	7.65	7.00	1.65	9.30	8.00	4.12	4.00
Ground Bone	1.96	.....	.....	.....	20.55	.....	7.00	27.55	.....	.....	.....
PARMENTER & POLSEY FERTILIZER CO.											
P. & P. Potato Fertilizer	2.17	1.64	2.80	4.32	7.12	6.00	3.35	10.47	7.00	7.17	6.00
Plymouth Rock Brand Fertilizer	2.75	2.47	6.62	2.42	9.04	8.00	3.32	12.36	9.00	4.19	4.00
Special Potato Fertilizer	3.90	3.29	5.00	4.14	9.14	8.00	1.97	11.11	9.00	7.35	7.00
Star Brand Superphosphate	2.08	1.64	2.37	5.02	7.39	7.00	3.26	10.65	8.00	3.26	2.50
Pure Ground Bone	2.57	2.00	.....	.....	14.88	6.00	12.47	27.35	16.00	.....	.....

Russia Cement Co.											
Essex A1 Superphosphate	1.17	1.00	.75	6.23	6.98	7.00	5.12	12.10	9.00	2.05	2.00
Essex Complete Corn, Grain, and Grass Manure	3.10	3.30	4.67	3.54	8.21	7.00	3.36	11.57	9.50	10.25	9.50
Essex Complete Manure for Potatoes, Roots, and Vegetables	4.30	3.70	6.07	2 68	8.75	7.00	1 52	10.27	9.00	7.68	8.50
Essex Corn Fertilizer	2.36	2.00	4.63	5.17	9.80	9.00	3.40	13.20	11.00	3.58	3.00
Essex Market Garden and Potato Manure	2.54	2.00	7.65	1.59	9.24	8.00	2.16	13.40	10.00	4.78	5.00
Essex XXX Fish and Potash	2.71	2.10	6.70	3.49	10.19	9.00	1.81	12.00	12.00	2.72	2.25

ANALYSES OF ASHES AND OTHER FERTILIZING MATERIALS SENT IN FOR EXAMINATION.—WOOD ASHES COMMERCIAL AND DOMESTIC.

Sent From.	Composition expressed in pounds per 100.			
	Moisture.	Phosphoric acid.	Soluble potash.	Total potash.
Commercial Ashes.				
Grange	10.78	0.96	1.89	5.36
Lancaster	23.47	1.68	4.42	4.81
Barrington	.....	1.55	3.9	5.84
Bennington	3.67	1.04	2.03	.....
Plymouth	26.79	1.43	1.96	.....
Bennington	25.9	1.80	2.70	.....
Domestic Ashes.				
Bennington	3.2	3.25	5.6	.....
South Wolfeborough	11.35	2.90	.....	8.82
South Wolfeborough	0.30	4.16	6.44	9.70

The samples of commercial ashes, which have been analyzed during the year, are with one exception distinctly inferior, because of the low percentage of soluble potash. Most of the commercial ashes had the appearance of ashes obtained from the kilns where limestone is burned. The samples of domestic ashes are much superior in both potash and phosphoric acid.

MISCELLANEOUS FERTILIZING MATERIALS.

Substance.	Sent from.	Composition expressed in pounds per 100.			
		Nitrogen.	Phosphoric acid.		Potash.
			Total	Insoluble.	
Ground bone	Littleton	3.25	22 10	.....	.....
Waste from cotton	Nashua	0.92	0.31	.....	1.03
South Caroline floats	Exeter	.....	30.50	.....	.....
Sulphate potash	So. Hampton	.....	.....	.....	49.28
Nitrate soda	" "	14.5	.....	.....	.....
Tankage	" "	5.27	14.35	6.09	.....

These different chemicals are good types of such goods, and show that the buyer of such materials is reasonably sure of getting his money's worth.

The waste from cotton is a substance thrown away by our cotton mills. It would make an excellent absorbent in the stable, and is as rich in manurial constituents as marsh hay or oat and rye straws.

Two samples of superphosphates were received, one of which was the common dissolved rock phosphate, known as acid phosphate or plain superphosphate, while the other was an imported article called double superphosphate or concentrated superphoshate.

They are grouped together to show the great difference in their composition.

	Plain Superphosphate.	Double Superphosphate.
Soluble phosphoric acid,	10.60	36.30
Insoluble phosphoric acid,	2.96	not determined.
Total phosphoric acid,	18.00	43.50

The double superphosphate was received from a florist and is especially valuable for greenhouse soils, as it contains little else than the different forms of phosphate of lime.

Two insecticides were analyzed as follows:

Bowker's "Boston White," received from the Department of Entomology,

Calcium oxide	52.00 per cent.
Arsenic trioxide	21.50 "
Carbon dioxide	21.34 "
Moisture	3.05 "

This is essentially calcium arsenite and calcium carbonate.

"Ferto-insectino," received from South Merrimack, N. H.

Calcium oxide	31.34 per cent.
Sulphuric anhydride	43.31 "
Water at 120°C	18.54 "
Insoluble matter	3.60 "
Copper	.23 "
Arsenic trioxide	.10 "

This insecticide is barely equivalent to a mixture of one pound of Paris green with two hundred pounds of ground plaster.

COMPOSITION OF MEADOW MUCK.

Locality.	Wet muck.			Dry matter.	
	Water.	Organic matter.	Nitrogen.	Organic matter.	Nitrogen.
Concord	32.60	6.78	0.18	10.05	0.27
Concord	53.26	10.22	0.29	21.86	0.62
North Hampton	82.3	8.6	0.34	48.85	1.90
Concord	63.22	14.30	0.38	38.88	1.03
South Wolfeborough	.....	.....	.....	35.02	0.57

Fred W. Morse,
Chemist.

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